

The Age of Precision Cosmology

David T. Chuss
NASA Goddard Space Flight Center

In the past two decades, our understanding of the evolution and fate of the universe has increased dramatically. This "Age of Precision Cosmology" has been ushered in by measurements that have both elucidated the details of the Big Bang cosmology and set the direction for future lines of inquiry. Our universe appears to consist of 5% baryonic matter; 23% of the universe's energy content is dark matter which is responsible for the observed structure in the universe; and 72% of the energy density is so-called "dark energy" that is currently accelerating the expansion of the universe. In addition, our universe has been measured to be geometrically flat to 1%. These observations and related details of the Big Bang paradigm have hinted that the universe underwent an epoch of accelerated expansion known as "inflation" early in its history.

In this talk, I will review the highlights of modern cosmology, focusing on the contributions made by measurements of the cosmic microwave background, the faint afterglow of the Big Bang. I will also describe new instruments designed to measure the polarization of the cosmic microwave background in order to search for evidence of cosmic inflation.